

Impact of Hyper Loop Transportation System on Urbanization in India

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Abstract- This paper focuses on studying the impact of hyper loop on urbanization in India. Hyper loop is a new mode of transportation wherein which travel is made in a vacuum tube where magnetically levitated pods are travelled at speed of up to 1200kmph. In study an assessment of hyper loop in all aspects of mobility that is efficiency, affordability, convenience and sustainability, in Indian context will be made.

In India the travel demand has rapidly increased in last four decades which is largest in Asian continent. There is a strong demand of high speed transportation system which reduces travel time with efficiency, accessibility and safety.

At present the highest speed of land transport is only 160kmph in India. Hyper loop is a fastest transit system on ground with low energy consumption and low carbon emission. India is struggling with challenges of high rate of unplanned urbanization in large cities of country with high population density, shortage of land, small & congested dwelling units with large dwelling unit proportions ranging an average of four to somewhere even seven, congestion, pollution etc. To reduce the load of urbanization large cities need planned diverted urban precincts to comparatively smaller cities through high speed sustainable connectivity. This paper studies the impact on economy, quality of life, regional connectivity, environment, urbanization trend and future opportunity in India.

Keywords – Urban Planning, Urban Transportation, Hyper loop, Mass Rail Transit System

I. INTRODUCTION

India is a developing densely populated country that faces some major urban everyday challenges, out of which urban transportation is a major problem. The problem lies beneath the idea of comfortable transportation as a pretention of ownership of vehicle for urban India. This ownership, belongingness of transportation from household to the destination, as thought of comfort and accessible transportation, inculcated since ages and a mindset among Indian folks has created a niche of a complete set of challenges for urban transportation. Shortage of time due to long travelling hours, long lasting jams on the heart of cities has escalated this all along.

India has 4000, cities and towns out of which 300 have a population of more than a lakh, it has seven major cities that have a population of more than 3 million. Through these cities and towns an Indian travels for an average commuting length period of 29 minutes every day one sided, while this exceeds to average an hour in cities having population of and over a million and an average 12% of minority commuters travel even more than an hour in seven major cities. In addition to this, data stands true for the commuters that are moving without hault (s). That means this average time bound to increase trifold if we look into the total time travelled for whole working day.

This induces all the working, physical, sociological, financial and last but not the least health challenges for populous of the nation.

II. HYPER LOOP TECHNOLOGY

India is a developing nation and looking forward for sustainable solutions of its urban transportation problems readily. Transit oriented development, BRTS, LRTS, and MRTS etc. Are some concepts of mass transportation and

infrastructure thereof along with physical, economic, and social urban planning that are introduced in recent times in the nation and are successfully driving.

Hyper loop is a mode of efficient freight and passenger transport that uses a sealed system of tubes with vacuum through which a pod travels substantially without friction. This system can convey passengers or goods with a hypersonic speed while being highly energy efficient. This can reduce travel time on land as well as air in some cases for over distances of 1500 km approximately.

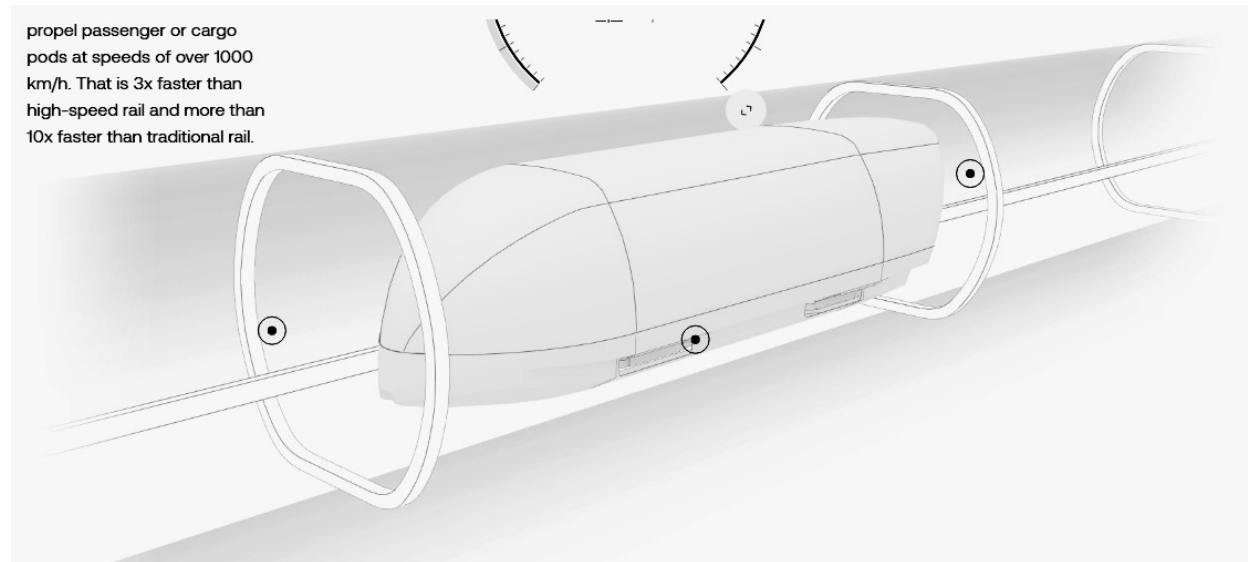


Figure 1. Propeller Passenger/ Cargo Pod schematic diagram

The vehicle runs on using no-contact electromagnetic levitation. Framework is exceptionally proficient at creating magnetic motion, expanding electromagnetic force and bringing down energy utilization by a significant degree compared with existing system. It does travel in a vacuum environment at a reduced air pressure as low as 200,000 ft above sea level.

III. SUSTAINABLE

System of Hyper loop transportation is fully electric and can draw power from any available energy source all through the route. This extends the freedom to use untapped solar energy in Indian context through using solar panels over the entire stretch of tube.

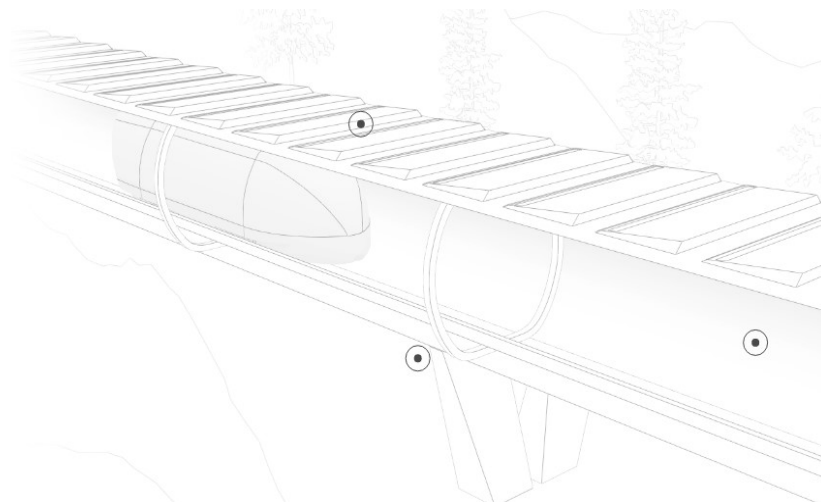


Figure 2. Use of Sustainable Power Means, schematic diagram

Depending on land profile, urban development of areas and environment, the Hyper loop works both above and below ground and is less expensive to build compared to high-speed rail hence economically viable and sustainable with lesser taken time to install and lesser evident space to run. Hyper structures can be built both above and below ground, avoiding dangerous grade crossings. Closed system architecture offers nil weather delays and eliminates interference.

Looking to the current pandemic situations which have altogether forced planners to rethink about the standards of design, keeping hygiene, social distancing and screening in mind. The whole of the Hyper loop system may be designed with lesser capacities in smaller pods having designed one seat system and kept a meter away, it can have temperature screening at the entrance and be denied entrance if not passing through the standards, it can be designed with auto controlled sanitizer frisking mechanism that auto sanitizes the seats as soon as it is evacuated by the passenger.



Figure 3. Graphical representation of the Interiors of the Passenfger Pods

IV. REGIONAL CONNECTIVITY: FUTURE OPPORTUNITY IN INDIA

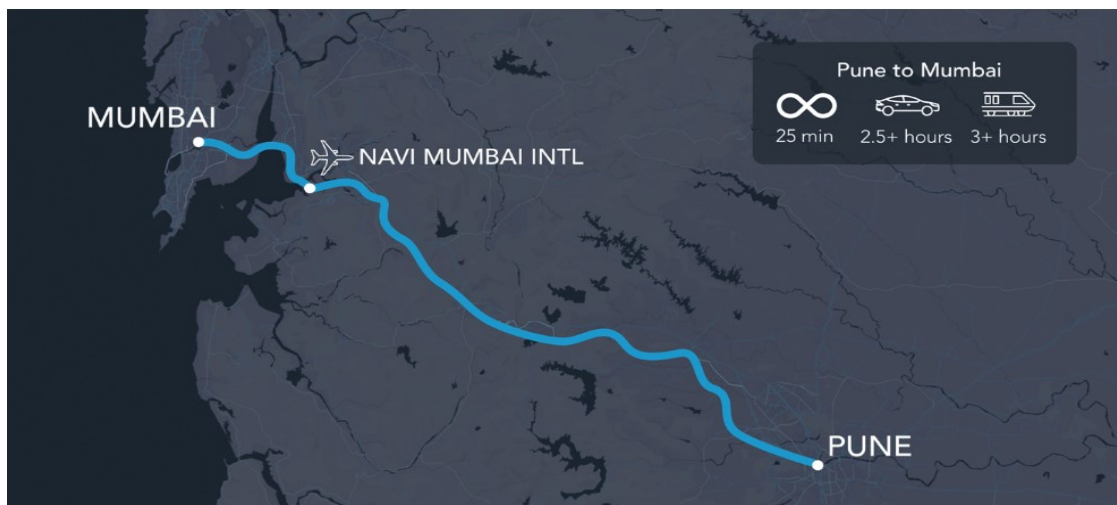


Figure 4. Mumbai to Pune : 147km in 25 minutes

There is an ongoing project work to connect Mumbai with Pune at regional level under 2022 vision document of NITI Aayog. This project proposes to connect both the cities in 25 minute stretch, which impacts the productivity of the whole region in terms of business, tourism, healthcare, education, workforce and occupational acceptance. Various routes are hereby identified with estimated travel time to attain commercial viability and national acceptability of the project.

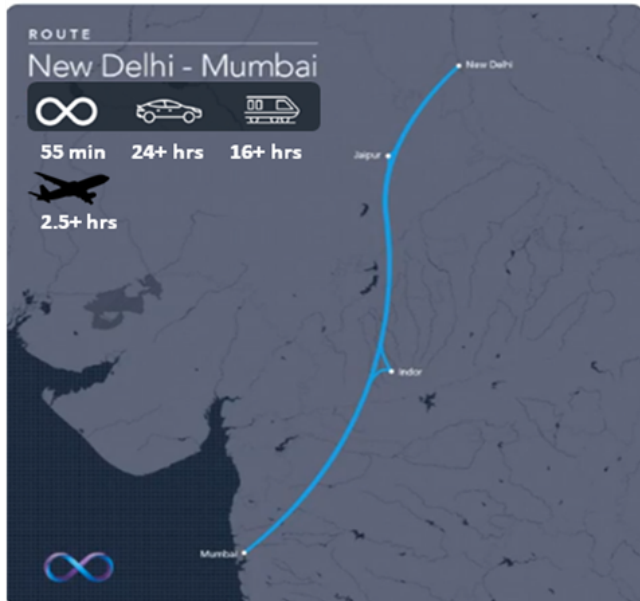


Figure 5. Delhi-to-Mumbai via Jaipur and Indore: 1,317km in 55 minutes

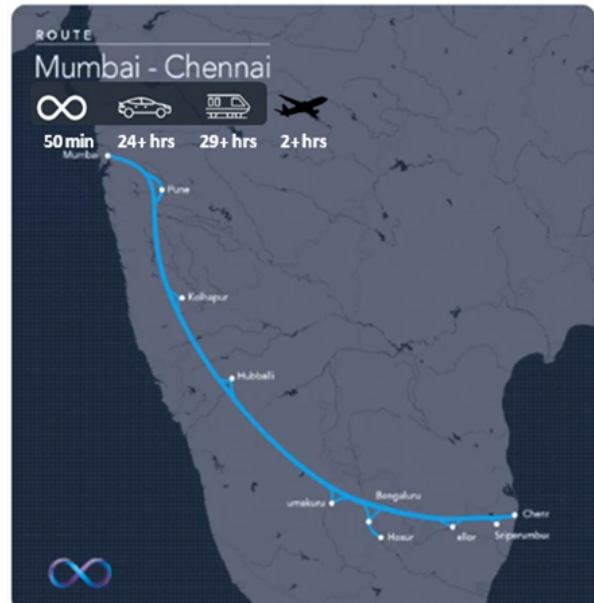


Figure 6. Mumbai to Chennai via Bangalore: 1,102km in 50 minutes

These hyper loop circuits further enhance the travelling experience; motivate travelling after a great setback in travel industry through safe and sustained means of pods. These circuits will be impacted by socio economic enhancement and development as per the physical infrastructure development of the mechanism and transportation mode.

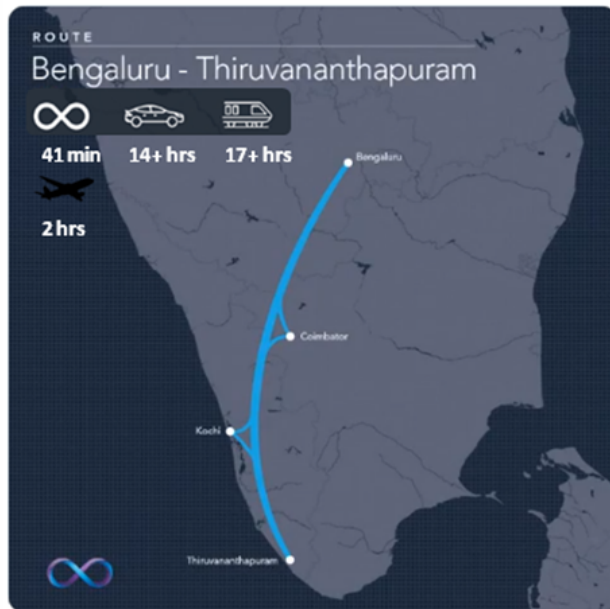


Figure 7. Bangalore-to-Thiruvananthapuram via Coimbatore and Kochi: 736 km in 41 minutes

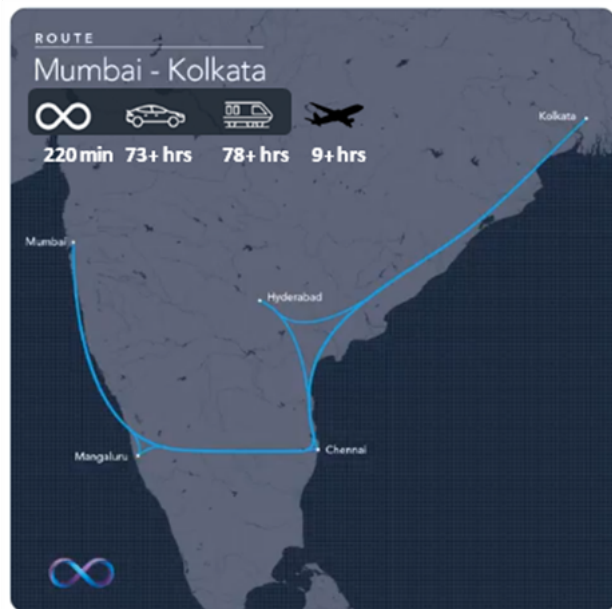


Figure 8. Mumbai-to-Kolkata via Mangalore, Chennai and Hyderabad: 3681 km in 220 minutes

These circuits further enhance the socioeconomic conditions of the inter regional connections and also enhance the workability of an individual being. Like a professional can happily live in Pune to work or study in Mumbai as the travelling time is reduced to just 25 minutes. This will eventually reduce the excess migrants load on the cities i.e., beings don't have to replicate the households to work in a certain city. This idea eventually generates a sustained form of living working model which somehow inculcates both sense of safety and freedom at a same time. This will further enable more cultural exchanges, more tourism, more economic sustainability of regions and increased financial interchange with high speed and less expensive cargo movements as well.

V. CONCLUSION

India has various variables that make it a perfect nation for a hyper loop framework. Foundation needs because of rising interest, unrivalled designing ability, ease producing base, strong political support and great administrative condition. These elements guarantee that the hyper loop, when fabricated and tried financially, will be affordable (for riders), versatile and efficient (to construct and work).

Once demonstrated for commercial viability, the hyper loop framework can be scaled to various city sets in India. View this from a multi-modular vehicle viewpoint and the genuine advantages of a framework like this come through – hyper loop innovation selection is a genuine empowering influence for India to leap-frog to a higher direction of development, much the same as the role that cell phones have played before as far as innovation, appropriation just as financial development.

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